THE SURGICAL ANATOMY OF THE TONSIL[1]

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ANY student of the literature of tonsillar operation must be struck by the meagre, vague and contradictory nature of the anatomical descriptions, nor can the shortcomings of the surgeons in this regard be made good by any ordinary study of the anatomists. This lack of precise anatomical teaching may to some extent account for tonsillectomy, probably the most commonly attempted of all operations, being certainly the most commonly unsuccessful.

There are obvious reasons for neglect by the two groups of investigators concerned. To the anatomist a tonsil rarely appears before an age at which it has atrophied to a shrivelled plaque, it has none of the beautiful complexity of the eye or the ear to attract study, and it belongs to that Cinderella of the systems, the Lymphatic. The surgeon on the other hand is dealing with a region difficult of access and lighting, very easily obscured by blood, and too often is using a method both blind and hurried.

I am only too conscious of the defects in the following attempt at a systematic description of those anatomical factors most important in the removal of the tonsil, an operation which is at present the only generally accepted surgical treatment of that organ. However, its conclusions have been worked out and confirmed in several thousand cases of tonsillectomy by dissection, and I hope that some of them are both useful and not usually known. At the worst the disproving of my statements may remedy the neglect which is the cause of this article.

I. DIAGRAMMATICAL REPRESENTATION OF THE TONSIL AND ITS SURROUNDINGS

The task of description of many parts of the body becomes easier if we have a simple and well-known diagram on which to work, as in the familiar cases of the tympanum, the stomach, or the colon. The diagram (fig. 1) of the tonsil and its surroundings, as seen from the inside of the pharynx, may serve this purpose.

It shows that the organ lies in a definitely triangular space, bounded by the two pillars of the fauces and the tongue. As it entirely fills this space during most of life it follows that it is itself triangular, with superior, inferior, and interior angles, and is not oval as it is usually described.

The exposed pharyngeal surface of the tonsil varies so enormously that it is hardly possible to represent it; but it is nearly always possible to distinguish the remains of the original diverticulum from which it developed. This is usually called by the obviously inaccurate name of the supra-tonsillar fossa,

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though, as Hett pointed out, it is in the substance of the tonsil, and not above it. It is only constant in its slit-like shape, with its long axis parallel to the lingual border of the tonsillar fossa.

II. ATTACHMENTS OF THE TONSIL

Some of the organs of the body are continually exposed to forces tending to dislodge them, and to resist these forces appropriate attachments are developed. The tonsil is such an organ, and in its case one force so much outweighs any others that it need alone be considered: it is that of swallowing. Every time this occurs a powerful downward and backward impulse is given to anything lying, as the tonsil does, within the grasp of the pharyngeal constrictors.

To counteract this force there are two attachments, one fibrous and one muscular. The first is a band of fibrous tissue (figs. 5 and 6) placed just where Arbuthnot Lane's doctrine of the crystallisation of lines of force would lead one to expect it, connecting the capsule of the anterior angle of the tonsil to the base of the tongue, where it blends with the muscle sheaths. This fibrous suspensory ligament is always present, and as might be expected is most marked in large and prominent tonsils; though like all structures of the kind it is much more easily demonstrated in living tissues still fulfilling their functions, than in the blurred and matted layers of the preserved cadaver.

The second anchorage is the insertion of the decussating fibres of the palatoglossus and palatopharyngeus muscles into the lower third of the tonsillar capsule (fig. 2). This is not a mere adherence, but a definite insertion with the object of lifting the tonsil up past the descending bolus as the soft palate rises in the act of swallowing. This action may have some importance in the production of mouth breathing in children, in many of whom the tonsils are so large that an airway in the pharynx can only be obtained when the tonsils are lifted by contracting the soft palate, at the price of shutting off the nasal airway.

III. BLOOD SUPPLY OF THE TONSIL

The traditional description of the blood supply is that it comes from half a dozen arteries, and that there is on the deep surface a peritonsillar venous plexus. I believe that the tonsil is supplied like an ordinary lymphatic gland, from a single artery entering a definite hilum, from which the veins emerge. In this case the hilum is always in the lower part of the buried surface close to the tongue (fig. 2), and the artery is the tonsillar branch of the facial. The other tonsillar arteries described ramify in the muscles and mucous membrane round about, but do not pierce the capsule.

There are usually two veins, which run out from the hilum through the superior constrictor close to where the artery passes through it, to end in the common facial trunk.

In consequence of this arrangement of the blood vessels the tonsil may be separated over two-thirds of its buried surface during tonsillectomy for the loss of only a few drops of blood. When the hilum is divided the artery may

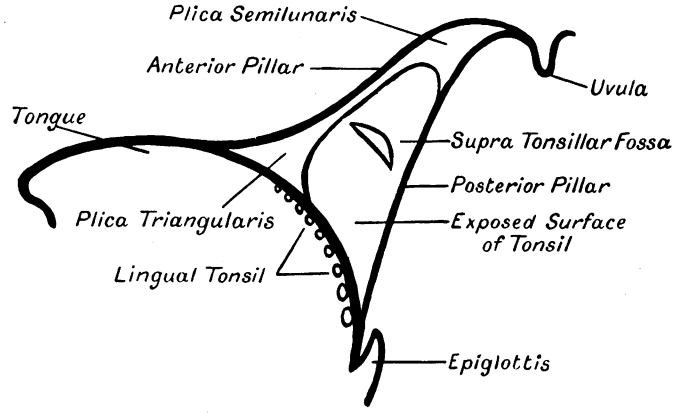

Fig. 1. Diagram of tonsil and surroundings.

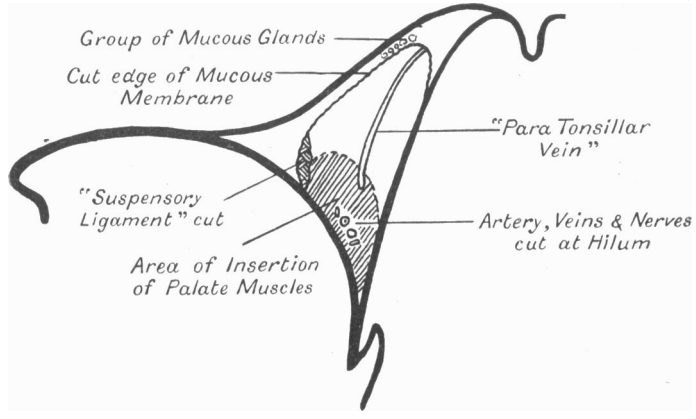

Fig. 2. Diagram of surroundings of tonsil after its removal.

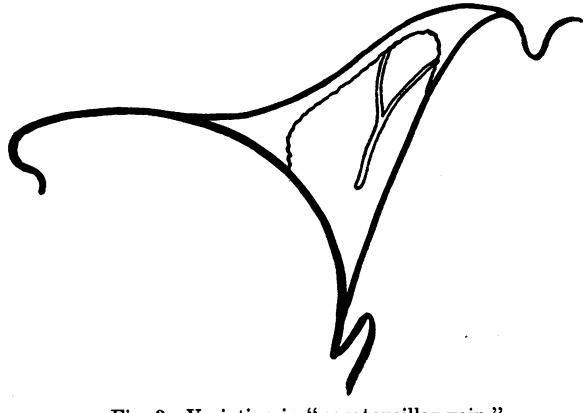

Fig. 3. Variation in "paratonsillar vein."

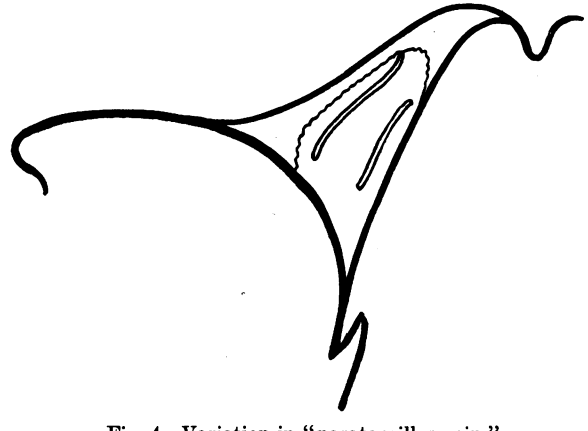

Fig. 4. Variation in "paratonsillar vein."

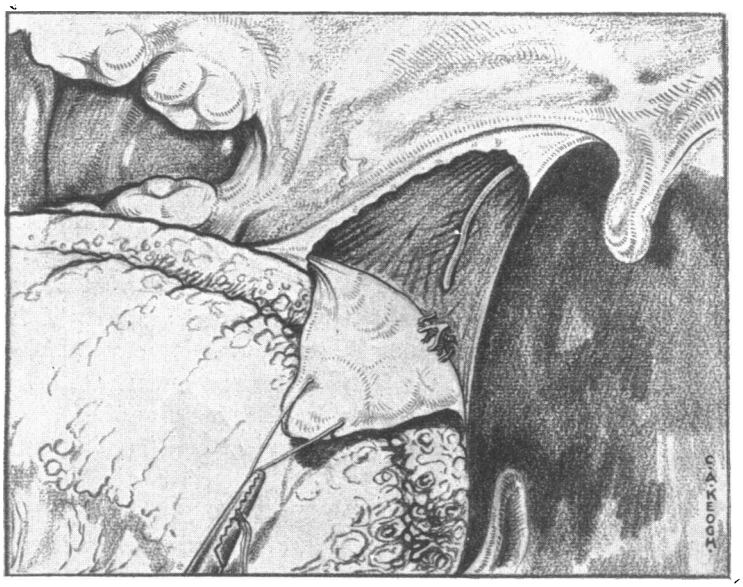

Fig. 5. Dissection of tonsil showing artery, veins and nerves entering hilum; "paratonsillar vein" lying free on the muscular bed, and suspensory ligament running from anterior angle into tongue.

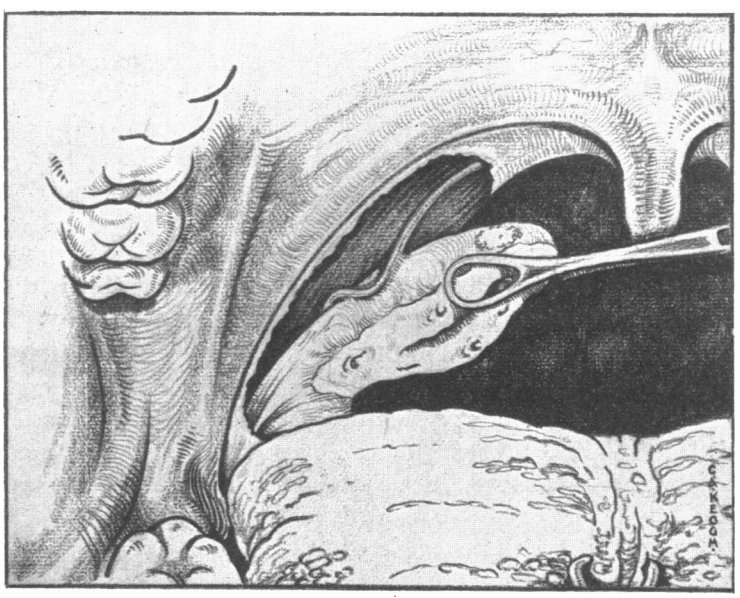

Fig. 6. Drawing from an operation. Showing "paratonsillar vein" adhering to tonsil as it is dragged from its bed. The suspensory ligament is seen as it appears in tonsillectomy.

spurt freely, but then like all arteries of that size, it quickly retracts and stops bleeding. The veins are very small and never allow any considerable back flow of blood.

Where then does the bleeding, that is often so free and occasionally so dangerous, come from? I am convinced that the dangerous vessel is a vein, inconstant in its course and form as the lesser veins tend to be, which runs down from the soft palate in the areolar tissue between the capsule of the tonsil and the muscles of its bed. Below, it pierces the superior constrictor near the hilum, and enters the common facial vein. As I have said, this vein is very variable: it may take the form of several small trunks, it may run in the muscles of the tonsillar bed, or it may be absent altogether. But in its most dangerous form it is a large, single trunk running close to the capsule and often adherent to it. When the tonsil is dragged out (fig. 6) it appears to a casual glance to be running into it, and has been so described.

The peritonsillar plexus of veins, which is so often described, I believe to be entirely imaginary.

IV. NERVES OF THE TONSIL

The glossopharyngeal nerve is only separated from the lower pole of the tonsil by a thin layer of superior constrictor fibres, and the plexus which it forms with the palatine branches of the sphenopalatine ganglion gives off some surprisingly large filaments which enter the hilum. It is probably through Jacobson's nerve that the referred pain in the ear after tonsillectomy arises, though I have no notion what governs the vagaries in the occurrence and severity of it.

V. MUCOUS GLANDS NEAR THE TONSIL

There is a very constant small group of mucous glands on the anterior surface of the upper angle of the tonsil. They are adherent to the capsule on their deep surfaces, and have their ducts discharging through the mucous membrane of the anterior pillar, so that they always cause a slight difficulty in separating the tonsil at this point.

It has been suggested that their removal may cause the feeling of dryness in the throat that occasionally follows tonsillectomy, but this is difficult to believe when one considers the numbers of similar glands close by.

VI. THE SURGICAL APPLICATION OF THESE POINTS

This is obvious. The "suspensory ligament" may be divided early in the operation, thus doing away with the main anchorage of the tonsil without increasing the bleeding. It is of importance also in that when a piece of tonsil is left behind by the guillotine, its centre is almost invariably the part of the capsule fixed by this inextensible band. The "paratonsillar vein," if it should be cut, retracts into the upper angle of the tonsillar bed, where it may be caught and ligatured.

I have to thank Dr C. A. Keogh for the great care and skill with which he has drawn a very difficult subject, and Prof. Wright, of the London Hospital, for his help and encouragement in the dissections to illustrate this paper.